

VULCAN CRUCIBLE STEEL COMPANY
(Aliquippa Forge)
100 First Street
West Aliquippa
Beaver County
Pennsylvania

HAER No. PA-278

HAER
PA
4-WEAL,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD

VULCAN CRUCIBLE STEEL COMPANY
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Location: 100 First Street
West Aliquippa, Beaver County
Pennsylvania

UTM: 17.563940.4499060
Quad: Baden, Pa, 1:24,000

Dates of Construction: c.1901-1950s (Morrow 1967; Sercel 1993)

Builder: Unknown

Present Owner: Mr. Ron Crouse, American Specialty Metals
P.O. Box 831, Willoughby, Ohio 44094

Present Use: Vacant

Significance: The Vulcan Crucible Steel Company was one of a number of American companies chosen to process uranium for use in the development of atomic weapons. In 1948-49 the company rolled uranium billets into rods for use in nuclear breeder reactors. This work was part of a nationwide fabricating effort immediately after World War II to create atomic weapons as part of President Harry Truman's 1947 Cold War policy of military supremacy over Russia.

Project Information
Statement:

The Former Sites Restoration Division (FSRD) of the U.S. Department of Energy (DOE), will dismantle two furnaces and a suspected mica pit as part of site remediation and decontamination. A Memorandum of Agreement between the DOE-FSRD and the Pennsylvania SHPO stipulated HAER documentation to mitigate this adverse effect. This documentation was undertaken to fulfill this stipulation.

Alexandra C. Cole
Formerly Utilized Sites Remedial Action Program
Contract No. DE-AC05-91OR21950
Science Applications International Corporation (SAIC)
816 State Street, Suite 500
Santa Barbara, CA 93101

NARRATIVE OVERVIEW OF COMPLEX

The former Vulcan Crucible Steel Company, located near the Ohio River in West Aliquippa, Pennsylvania, is a former tool steel company complex that includes four large buildings interconnected to form a J shape, with four small adjacent buildings, built between 1901 and the 1950s. The site also includes a water tower, an oil tank, a cooling basin and cooling tower, and a number of railroad spurs connecting the various buildings to each other (See Layout of the Vulcan Crucible Steel Company). Originally the complex was linked to the Pennsylvania and Lake Erie (P&LE) Railroad line immediately to the west by a spur line, but these tracks have been removed. Much of the outside paving between the buildings consists of bricks, a number of them stamped with "Metropolitan Block, Canton, Ohio" or "Bessemer Block, Youngstown, Ohio". The area is overgrown with ailanthus trees, grapevines, and weeds. The eight-acre parcel lies at the end of an overpass connecting Aliquippa with West Aliquippa, and is bounded on the north by the site of the former L.T.V. steel company, on the south by worker housing, on the east by Beaver Avenue and on the west by the P&LE Railroad right-of-way adjacent to state Highway 51.

The Vulcan Crucible Steel Company, one of Aliquippa's earliest manufacturing plants, was founded in 1901 to produce high grade tool steel, with a specialty in high speed (tungsten) steel. The three founders of the Company, first chartered in New Jersey and later in Pennsylvania, were Walter S. Kidd, Sr., Rutherford Burgher, and W. A. Shaw. The tool steel produced at the Company was fabricated elsewhere into various machine shop products such as lathes, planers, files, chisels, drills and punches. The plant hired approximately 150 men (The Story of Pittsburgh, p. 188; Montini, March 9, 1977; Morrow).

Aliquippa was an excellent choice as a location for the Company because of its abundant supply of raw materials needed for steel production, such as water, natural gas, oil, iron ore, and coal, and a nearby source of transportation by water and rail, via the Ohio River which opened markets to the Mississippi and the south, and the P&LE Railroad, chartered in 1877, which connected Youngstown, Ohio, with Pittsburgh (Bausman, p. 136). Rail access to the P&LE Railroad came from a private railroad spur, constructed through the property in 1906, by Jones & Laughlin, a huge steel company built that year immediately to the south.

The purpose of the Company, according to its charter, was "To manufacture, buy, sell, deal in and with iron, steel, or both". However, in the competitive steel market, the founders realized that to be successful they would have to specialize. They chose to limit their product to tool steel, and produced a number of alloy and carbon steels, such as "Special", "Extra", "Superior", "Fort Pitt", "Extra Drill", and "High Speed", which could be chosen by the fabricator according to the type of tool which needed to be produced (The Story of Pittsburgh, p.188). Through research in the early 1900s, the Company developed "the first multiple alloy High Speed Steel", called "Wolfram" (Morrow).

The Company initially melted high speed steel with the crucible process, beginning operations with a 30-pot crucible melting furnace. An open hearth furnace was used to melt other grades of steel. Changing technology caused the company to replace the crucible and open hearth furnaces between 1916 and 1921 with 3-ton electric melting furnaces. Two original coal-fired annealing furnaces were replaced by gas-fired units, and the original power source, steam, was replaced by compressed air, at an unknown date. The Company continued to replace obsolete equipment as more efficient procedures for manufacturing steel were developed (Morrow).

In 1928 the plant expanded north to incorporate the adjacent Russell Shovel Company, one of Aliquippa's earliest industries, dating from 1891, which had become defunct through labor disputes. As the Company grew and prospered it established warehouses and agencies in Boston, Chicago, Detroit, New York and St. Louis (Morrow).

During the period from 1948-49, in addition to its steel manufacturing, the Company rolled uranium billets for the Manhattan Engineer District/Atomic Energy Commission on an "as-needed" basis. In 1955 the Vulcan Crucible Steel Company was bought by the H.K. Porter Company, which continued the same line of production as Vulcan. The Company was renamed the "Vulcan Crucible Steel Division of H. K. Porter, Inc.". In 1958 when the Porter Company bought the nearby Kidd Drawn Steel Company, both plants were combined and called the "Vulcan-Kidd Division of H.K. Porter, Inc. (Morrow). In 1966 Universal Cyclops Specialty Steel Company of Pittsburgh, part of Universal Cyclops, Inc. bought the complex and used it to anneal and condition high temperature alloys and tool steel, which they supplied to their Titusville and Bridgeville, Pennsylvania divisions to be forged into products ("The Aliquippa Area"). In 1981 the plant was closed. In 1987 the Aliquippa Forge bought the plant and used it for limited production. In 1991 the plant was closed again and is now owned by American Specialty Metals.

BUILDING DESCRIPTION AND USE

According to Vincent Sercel, former maintenance man from 1945 to 1988 at Vulcan Crucible Steel Company, the various buildings in the complex were used for the following purposes: Building 1 contained the large furnaces which melted the steel; Building 2 was the shipping and receiving department; Building 3 contained the heating furnaces and the rolling mills; Building 8 contained the large compressors to run the machinery; Building 9 was the maintenance shop; Building 10 was the blacksmith shop for making forging equipment; Building 16, built in the 1950s, served as the bathroom and shower rooms; and Building 17 housed the transformer.

Eight additional buildings, shown on a 1978 map, were once part of the original Company but are now gone (See Layout of the Vulcan Crucible Steel Company). Building 4 was a brick office, built in 1913-1914; Building 5 was a laboratory, where new processes and products were developed; Building 6 was a heat treating area to check quality control; and Building 7 was a brick warehouse, built in 1916-17. Buildings 12 and 14, to the north, part of the 1891 Russell Shovel Company, were for storage; and Buildings 11 and 15 were grinding sheds (Vincent Sercel, interview June 21, 1993; (Morrow).

The majority of the existing buildings on-site appear to have been constructed in the period from 1901 to 1920, judging from the construction technology of the brick, wood, concrete, and sheet metal components.

Buildings 1, 2, 3 and 8 are interconnected, and are all constructed of steel post and truss frames and covered on the roofs and sides with corrugated sheet metal. A system of rail spurs links the buildings. Building 1 is a 565' x 65' structure approximately 3 stories high. The central section is topped by a gable-roofed monitor with metal vents, while the north and south sections have ventilators which run along the ridge. Long banks of windows have been covered with corrugated sheet metal. The walls are punctuated with sliding metal doors. A shed-roof and a gable-roof addition extend from the west side, and were added in the 1950s by the H. K. Porter Company to house furnaces. The building is connected

to Building 2 at its south end by a shed roof addition. Building 2 is a small 2 story building with a gable roof. Large sliding doors open to the south.

Building 3, measuring approximately 128 feet by 266 feet, is 2-1/2 stories high and sits on a raised concrete foundation. The building is divided into two E/W bays: the west bay has a medium pitch gable roof topped by two large turret ventilators and five round ventilators; the east bay has an off-center gable roof punctuated with skylights and topped by an elliptical ventilator that runs along the ridge. A bank of translucent corrugated fiberglass panels provides light along the west and south sides of the west bay. Large sliding double doors of corrugated metal on the north and west sides provide access to the building. Additionally there is a single door on the east side. A small one-story, shed-roof lean-to of yellow brick extends from the northeast corner, with two segmented-arch windows which have four-light fixed pane wood sash windows. Remnants of train tracks run both east/west and north/south, with a turntable in the north section of the building. These were used to haul materials in buggies from building to building, and from area to area within building 3, before the floor was covered in steel plates and the tracks no longer used (Vincent Sercel, June 23, 1993). Building 3 is connected at the southeast to Building 2, and at the north to Building 8. A 42" high concrete raised loading dock extends along the southwest facade of the east bay.

Building 8 is a small rectangular building of three rooms housing two large air compressors, a storage room and a tool room. A system of pipes carries the air from the compressors into the accumulator tanks to the east of the building and thence to each building to run the machinery.

Adjacent to building 8 on the west are a cooling pond and a cooling tower, built in the 1950s by the H. K. Porter Company. The pond is a concrete reservoir into which the hot water from the furnace and air compressors was collected before being pumped into the adjacent water cooler to have the heat dissipated.

Building 9 is a two-story concrete building of post-and-beam construction on a 5' raised concrete foundation. The shallow pitched gable roof is covered with corrugated metal sheets. The east and west elevations have banks of windows with 9 over 9 light wood sash. A number of these windows have been replaced with translucent sheets of plastic or with corrugated metal. Doors on the east and west sides wood on metal sliders. A door on the south has been infilled with corrugated metal. Within this building are a number of tools driven by a belt system.

Building 10, a one-story gable-roofed building, is constructed of concrete block faced to look like ashlar stone. Both gables consist of shiplap siding. The roof sheathing is 1" x 12" wood on 2" x 4" rafters, covered with asphalt shingles. Doors on the east and west sides are constructed of wood 1" x 6" boards on metal tracks.

Building 17 is a two-story yellow brick building with a flat roof, housing a transformer. There are two metal doors on the west side.

Building 18 is a rectangular yellow brick building, constructed in the 1950s by the H.K. Porter Company as a bathroom and shower facility. The southern half is one-story, with an asphalt covered gable roof. The northern half rises to 1-1/2 stories, with the additional height constructed of asbestos rigid panels within a metal framework. Band of metal-framed 8-pane windows light the east and west sides.

A raised water tower and a ground level metal oil tank are sited to the west of the complex.

HISTORICAL CONTEXT

Building 3 at the Vulcan Crucible Steel Company has significance culturally as one of a nationwide system of manufacturing plants contracted by the Atomic Energy Commission (AEC) immediately after World War II to refine uranium. This uranium was then used to produce plutonium for the development of bombs as part of a Cold War strategy to deter Russian aggression. During the time from July 1948 to late 1949, the Company rolled uranium billets into rods which were then sent to the Hanford, Washington reactor.

The AEC mandate to use nuclear power for military purposes arose from the development of the atomic bomb in the early 1940s at the Manhattan Engineer District, in Chicago, Illinois, a discovery which led to the bombing of Hiroshima and Nagasaki and the ending of World War II. Immediately after the war, in 1946, the Atomic Energy Commission was established with the directive to develop both military and peacetime uses for the newly discovered nuclear energy. Through the influence of Enrico Fermi, who had worked on the original bomb, the priority turned towards the development of uranium and other raw materials for weapons production and the manufacture of bombs rather than for peacetime applications (Clarfield, pp. 113, 121).

This trend towards military rather than peacetime uses of nuclear energy came about in part because of the political climate during the years from 1945 to 1950, at which time the stance of the U.S. towards Russia hardened into the Cold War, with the belief that the Russians were planning to claim the world for Communism and to eradicate the U.S. through nuclear attack. A series of events during these years led to this belief: in 1946 Alan Nunn May, A British subject who had worked on the development of the first bomb was arrested and accused of giving nuclear information to the Russians during the war; Russian troops invaded Iran; Russia blockaded Berlin in 1948-49; the Communists took over China in 1949, and Russia detonated its first bomb in 1949 (Clarfield, p. 144).

As a result, President Truman in 1950 chose officially to work towards the development of the H-bomb, fueled with plutonium, a far more massive bomb than the A-bomb, which would have the capability of genocide (Clarfield, p. 135).

During these post-war years from 1946 to 1950, the AEC's first mandate was to produce reactors which would manufacture plutonium for nuclear weapons (Clarfield, p. 125). The first reactor, at Oak Ridge, Tennessee, had been built during the war as the field headquarters for the Manhattan Project, and was the site where uranium 235 was produced for the atom bombs. A second reactor was developed in Hanford, Washington in 1943, as an alternative to Oak Ridge which had become too small, and was too close to the populated area around Knoxville to provide proper safety (Mazuzan, pp. 9-10; Hewlett, pp. 188-190).

Almost all the uranium processed at this time was sent to the Hanford, Washington reactors to be used to produce plutonium. Many of the contractors hired by the AEC at this time to take part in one or another phase of the uranium refining were those who had worked for the Manhattan Project during the war. It is unclear whether or not the Vulcan Crucible Steel Company had worked with the Manhattan Engineer District during the war; archival information thus far indicates their ties with the AEC were during 1948-49 only. Thus far the reason for contracting with Vulcan has not been found in archival documents. Possibly the company's New York office may have become known to the AEC's New York

office which served as the center for the AEC's uranium-procurement operations (Mazuzan, p. 11). Possibly Vulcan was chosen because its specialty in processing high grade tool steel, which was very hard, meant that the Company had the rolling equipment which could handle the hardness of uranium. In any case, the AEC included Vulcan Crucible Steel Company in their network of civilian manufacturing companies to refine uranium to be sent to the Hanford, Washington reactors, although its connection to the U.S. nuclear production effort lasted only a brief 1-1/2 years. From 1950 on, after the clean-up of Building 3, the Vulcan Company returned entirely to the production of tool steel.

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Maps

"Aliquippa. Formerly Woodlawn, including West Aliquippa and Part of Hopewell Township." Sanborn Map, 1929.

"Map of the Pittsburgh District Showing Railroad Terminals and Location of Iron and Steel Works Having Track Connections." Compiled by the National Tube Company, Pittsburgh, Pa., 1914.

U.S.G.S. Map. Baden Quadrangle, Pennsylvania. 1953. 7.5 minute

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Persons Contacted

Cooling, Dr. Frank. Chief Historian, DOE, AEC Records Headquarters, Germantown, Maryland

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Pursell, Carroll, Ph.D, Case Western Reserve University, Cleveland, Ohio

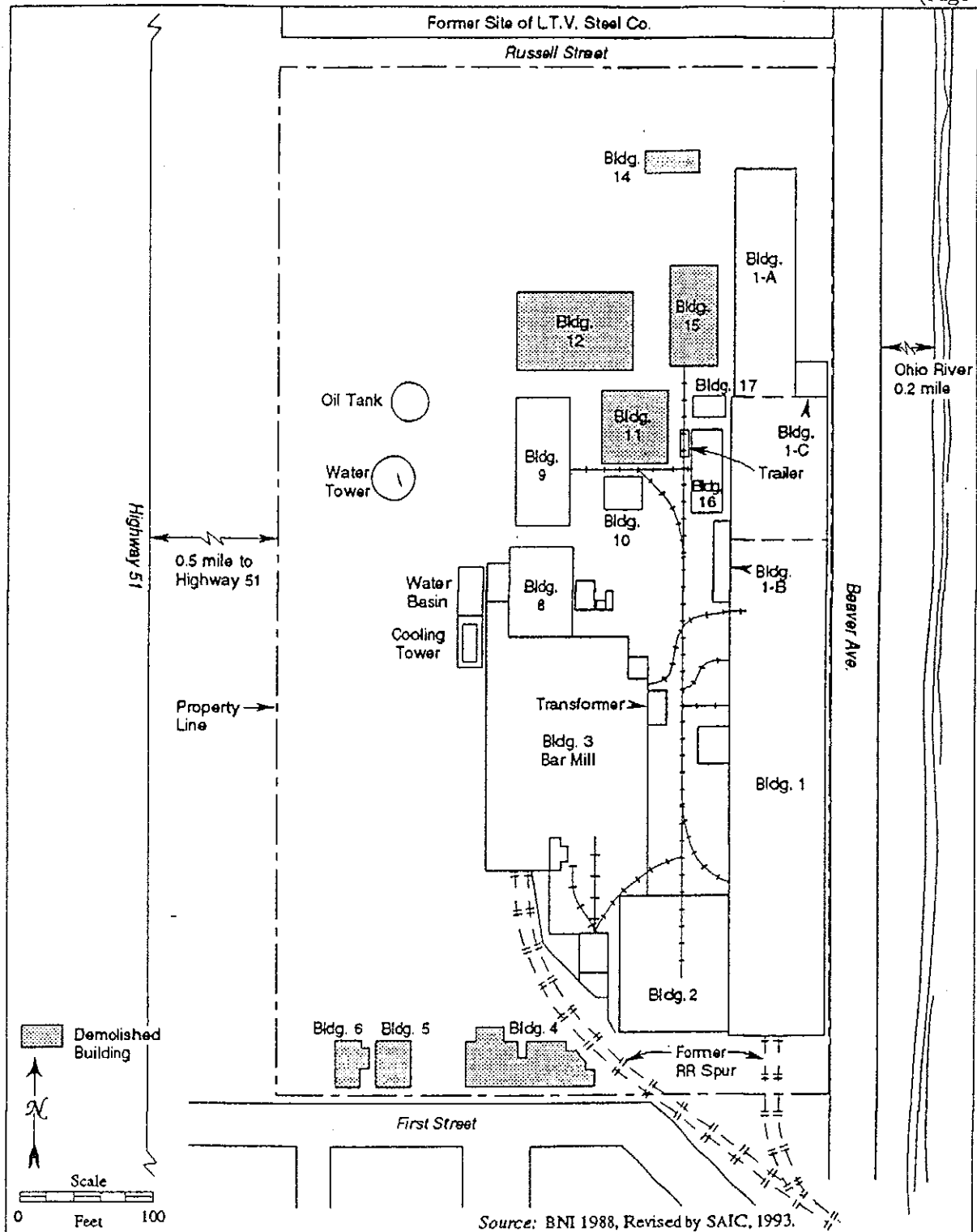
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Young, Charles, Roy F. Weston Inc., Washington, D.C.



LAYOUT OF THE VULCAN CRUCIBLE STEEL COMPANY SITE (ALIQUIPPA FORGE)
 (Reduced to 95%)